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(71) Applicant (for all designated States except US): **CANATU OY** [FI/FI]; Uusi Porvoontie 696, FI-01120 Västerskog (FI).

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(72) Inventors; and

Declarations under Rule 4.17:

(75) Inventors/Applicants (for US only): **KAUPPINEN, Esko** [FI/FI]; Tilhipolku 1 B, FI-00730 Helsinki (FI). **BROWN, David, P.** [US/FI]; Vaasankatu 7B 28, FI-00500 Helsinki (FI). **NASIBULIN, Albert, G.** [RU/FI]; Sunanlaakso 1 I 24, FI-02760 Espoo (FI). **JIANG, Hua** [CN/FI]; Servinkuja 2 E 45, FI-02150 Espoo (FI). **MOISALA, Anna** [FI/FI]; Haltijatontuntie 4/6 A1, FI-02200 Espoo (FI).

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(54) Title: **SINGLE, MULTI-WALLED, FUNCTIONALIZED AND DOPED CARBON NANOTUBES AND COMPOSITES THEREOF**

(57) Abstract: The present invention relates to single walled and multi-walled carbon nanotubes (CNTs), functionalized CNTs and carbon nanotube composites with controlled properties, to a method for aerosol synthesis of single walled and multi-walled carbon nanotubes, functionalized CNTs and carbon nanotube composites with controlled properties from pre-made catalyst particles and a carbon source in the presence of reagents and additives, to functional, matrix and composite materials composed thereof and structures and devices fabricated from the same in continuous or batch CNT reactors. The present invention allows all or part of the processes of synthesis of CNTs, their purification, doping, functionalization, coating, mixing and deposition to be combined in one continuous procedure and in which the catalyst synthesis, the CNT synthesis, and their functionalization, doping, coating, mixing and deposition can be separately controlled.